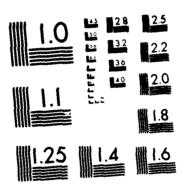
SELF-TRAPPED STATES IN A SATURABLE KLEIN-GORDON EQUATION(U) NAVAL OCEAN SYSTEMS CENTER SAN DIEGO CA R C SHOCKLEY SEP 86 1/1 UNCLASSIFIED F/G 20/10

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Richard C. Shockley

Naval Ocean Systems Center, San Diego, California 92152

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We present numerical and theoretical results for self-trapped states in the lossless, saturably nonlinear Klein-Gordon equation  $u_{tt} - u_{tt} = -u/(1 + u^2)$ . A simple approximate analytic theory is developed which agrees well with self-trapped states found in simulations to emerge from certain types of localized, stationary, one-sided displacements,  $u(x,0) \ge 0$ ,  $u_t(x,0) = 0$ . The stability of these states to strong perturbations is studied by pulse-collision simulations, using for the perturbation one of the two travelling-wave pulses generated in the fast dissociation of a highly unstable initial displacement. The self-trapped states are highly stable, exhibiting a shape change and centroid shift after collision, but little energy loss or change of period.

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